

DEVELOPMENT OF THE SUPPLY CHAIN MANAGEMENT CONCEPT UNDER THE CONDITIONS OF GLOBAL ECONOMIC TRANSFORMATIONS

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Abstract

The article covers the development of conceptual provisions for improving the supply chain management system in terms of ensuring the competitiveness of supply chains in the context of global economic transformations. It is emphasized that due to intensification of international division of labor, acceleration of scientific and technological progress and other dynamics of modern civilization, the scale, degree of association and interdependence of the development of productive forces are increasing. An increasing number of world economic structures are turning into open, and then sheer systems. In contrast to the closed systems typical of the industrial era, they reveal an objective tendency to transform into more complex infra-systems, which include, first of all, integrated logistics chains. It is in such logistics chains that the obstacles that separate the production and non-production areas of management in technological and economic relations vanish. This is due, on the one hand, to the unity of production and infrastructure flow processes, and on the other, to the revival of autonomy, mobility, flexibility of all elements and parts of such chains. The necessity of making adjustments to the classification aspects of the supply chain management concept is justified, as they are considered from the point of view of the object approach (i.e., the totality of organizations interacting in material and other flows from the source of raw materials to the final consumer), as well as in the context of process approach (i.e. systemic totality of flows and processes necessary to satisfy the requirements of consumers in goods and services). This creates the conditions for the formation of clearer classification approaches for the purposes of studying certain categories of supply chains (for example, by the number of levels of suppliers and consumers in the supply chain; by the type of products manufactured, etc.). The need for a clear demarcation of conceptual approaches in a traditional and integrated logistics concept is also confirmed. It is emphasized that the content of the latter consists in the implementation of the integrated coordination of the logistics chains and their links at the micro, meso and macro levels, both in material, information, financial, and other flows.

Keywords: global economic transformations, infra-systems, logistics, supply chain management, logistic concept.

INTRODUCTION

Under the influence of intensified international division of labor, accelerated scientific and technological progress and other factors of modern civilization, the scale, degree of association and interdependence of the development of productive forces are increasing. An increasing number of world economic structures are turning into open, and then sheer systems. Unlike closed systems, typical of the industrial era, they reveal an objective tendency to transform into more complex infra-systems, which are primarily associated with supply chain management.

It is in such chains that the obstacles that separate the production and non-production areas of management in technological and economic relations disappear. This is due, on the one hand, to the unity of production and infrastructure flow

processes, and on the other, to the revival of autonomy, mobility, flexibility of all elements and parts of such chains.

Supply chains formed as a result of globalization take the form of integrated associations in the form of corporate and associative market structures and require for their effective development new forms and methods of management based on modern logistics and information technologies.

Integrated logistics in these conditions has a special place. On its basis, supply chains are created that are adequate in complexity and structural diversity to modern management facilities – transnational (TNCs) system entities in the global and national economies. Under internationalization of global economic processes, global supply chains allow:

- effectively coordinate the multi-purpose activities of economically and legally diverse as well as independent structures for the manufacturing of products and services based on the use of process-oriented management methods;
- include numerous market participants in a single network information space;
- unite the logical activities and potentials of market participants in order to achieve a tangible synergistic effect from their partnership supply chain activities.

As a result, competition between the participants of the goods distribution (supply chain) being destructive for the society and the structures themselves is replaced by productive alliances aimed at the final result.

Thus, all of the above emphasizes the particular relevance of systematic scientific research in the context of supply chain management in global economic processes.

PREVIOUS RELATED RESEARCH

A significant contribution to the development of the theory and methodology of logistics and the concept of supply chain management was made by such well-known Ukrainian and foreign scientists as D. Bowersox, D. Closs, I. Takahara, M. Christopher, J. Chevalier, T. Van, S. Karnaukhov, E. Krikavsky, R. Larina, D. Novikov, M. Oklander, O. Protsenko, A. Smekhov, N. Chukhrai, V. Shcherbakov, etc.

However, a set of scientific and practical problems related to the development, primarily, of the concept of supply chain management, is not covered enough even in foreign literature. In the Ukrainian economy, the spread and practical use of supply chain logistics is just under way. Many theoretical and methodological provisions of this science are debatable and evolve as it is approved in the practice of Ukrainian entrepreneurship. This is expressed both in a different interpretation of the essence of the concept of supply chain management, and in varying strategy, forms and methods of its practical use.

In this regard, the purpose of this article is to generalize the scientific approaches to the formation of supply chain management systems in countries with an evolutionarily smoothly running economy and to develop on this basis the concept of supply chain management in the context of global economic transformations.

RESEARCH RESULTS AND DISCUSSION

At the turn of the XX-XXI centuries logistics has undergone significant changes both in the implementation of logistics technologies, and in the field of goal-setting. The new quality of logistics was demanded by high competition in world markets, the introduction of products with relatively short life cycles, as well as by constantly growing consumer expectations for product quality and logistics services. Accordingly, an additional line characterizing the situation at the beginning of the 21st century should be added to the previously proposed chronology of the company's competitive policy formation (Table 1).

Table 1. The main stages of company's competitive policy

Period	Paradigm	Main criterion	Main function	Goal-setting science	Main resource
The early XX century – late 1920s	Production	Volume and costs of production	Production	Production organization. HOT	Technical
1930s	Sales	Sales volume	Sales and marketing	Sales organization and management	Spatial and organizational
Late 1940s – late 1950s	Product	Product quality	Control and management	Enterprise economics	Technological
The early 1970s	Market	Consumption	Marketing and after-sale service	Marketing	Informational
Mid 1970s – late XX century	Resource	Resource potential of the company, distribution costs	Production and commerce	Logistics	Institutional and management
XXI century	Competition	High quality delivery	Business integration	Supply Chain Management	Economic and communicative

Source: systematized by the authors based on [2; 8]

For the last couple of decades, primarily due to the introduction of modern high technologies, production costs have decreased, as far as the current stage of scientific and technological progress has allowed. The deepening of specialization as a necessary factor in this phenomenon, in turn, assumed a reasonable development of cooperation and integration of business entities. However, despite the introduction of logistics as a functional management responsible for controlling the material flow and relevant information and finances within the reproduction cycle of individual firms, the sphere of distribution could not provide a level similar to the sphere of production.

That is why, as the development of such a logistic concept – LeanProduction (LP) and the Just-in-Time principle, in the 1990s emerged the concept of Supply Chain Management (SCM), defined as the integration of key business processes starting from the end user and covering all suppliers of goods, services and information that add value for consumers and other interested parties. Moreover, the supply chain is seen as three or more economic units (organizations or individuals) that are directly involved in external and internal flows of products, services, finances and information from source to consumer [2].

Initially, the term “supply chain management” was understood as a synonym for the terms “logistics” and “logistics management”. In recent years, the interpretation of the SCM category has undergone a change in its interpretation as a new business concept. We believe that both of these interpretations fail to reveal accurately the meaning of this phenomenon. We will try to prove this and offer an independent interpretation of the problem.

When considering supply chains, there are three difficulty levels, various options of which are presented in the figure. A chain consisting of a focal company (manufacturing or commercial firm), as well as its supplier and consumer, is called a direct supply chain.

If at least a II-level supplier and consumer are added to them, then it is called an expanded supply chain. The maximum supply chain includes the entire set of business entities from the initial supplier to the final consumer (Figure 1).

Consideration of the SCM-concept only as a type of integrated logistics carried out outside the focal company and including consumers, suppliers and contractors, to a large extent disavows the idea of logistics and provides “non-integrated” logistics just as an ordered set of transport and storage operations. It should be noted that logistics remained like that for quite a long time. It took a twist due to the situation at the close of the twentieth century, when the issue of total control over resource and commodity distribution within the framework of direct supply chains turned out to be practically unsolvable.

A positive perception of the SCM concept has led to the revision and definition of logistics itself. According to the definition of the Logistics Management Council (USA) in 1998, logistics is defined as part of the supply chain process during which it is possible to plan, implement and control efficient and productive flow of goods, their inventories, service and related information from the point of origin to the point of absorption (consumption) in order to meet the requirements of consumers [6].

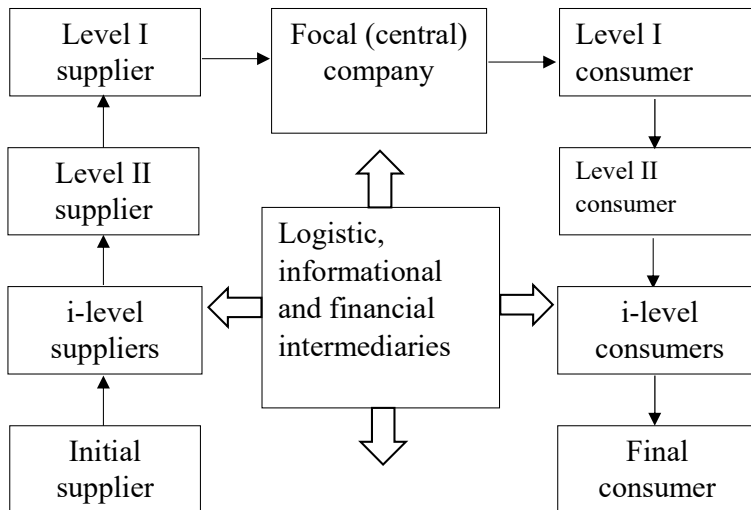


Figure 1. Generalized view of the supply chain

Source: developed by the authors based on [8; 9]

Thus, supply chain management appears to be a more global category than logistics. SCM key business processes are no longer disputed:

- customer relationship management;
- customer service;
- demand management;
- order fulfillment management;
- production operations management;
- supply management;
- product design management and bringing it to commercial use;
- return material flow management.

A close examination of these business processes makes it appropriate to consider another definition of SCM [9]. According to the definition of the European Logistics Association, supply chain management is an integrated approach to business, revealing the fundamental management principles in the logistics chain, such as the formation of functional strategies, organizational structure, decision-making methods, resource management, implementation of supporting functions, systems and procedures. This approach allows us to conclude that SCM, significantly exceeding the level of competence of “non-integrated” logistics, really poses new challenges for the company’s logistics management. Their solution will require a new level of interaction between logistics management and other types of functional management of the company. However, SCM does not offer anything going beyond private logistic concepts, but a logistic paradigm.

The ambiguity in the relationship between the logistics categories and SCM, in our opinion, is the result of an incompletely clarified relationship between categories such as concept and paradigm.

A paradigm is referred to be as a set of prerequisites that determine a specific scientific research (knowledge) and are recognized at this stage. The dominance of a certain paradigm is a period of normal (extensive) development, which ends when the paradigm “explodes” from the inside, under the pressure of contradictions and problems that cannot be solved within its framework. A crisis comes when new paradigms that compete with each other are created. The crisis is resolved by the superiority of one of them, which means the beginning of a new normal period (cycle, stage of development), and the whole process is repeated anew [4]. The table above gives an idea of a number of paradigms in the field of economic activity.

In the generally accepted sense, a concept is a leading view, a certain way of understanding, interpreting a phenomenon; the birth of an idea, a basic thought. Numerous literary sources describe analytical, technological (informational), marketing, and integrated logistics concepts. The content of the latter consists in the implementation of the integrated coordination of logistic systems and their links at the micro, meso and macro levels, both in material and in information, financial and other flows. Herein, strategic management, business process reengineering, system analysis, general system theory, and synergetic economics are used as scientific tools.

Comparing the contents of the integrated logistics concept and the SCM concept, one should note their qualitative similarity and quantitative difference in the scale of tasks (with the clear superiority of the SCM concept). These quantitative

differences will undoubtedly lead to qualitative changes. If direct supply chain management is possible within the micro-logistics system, then the transition to an expanded supply chain will require meso-logistics systems integration. Effective management of the maximum length-wise supply chain will require mandatory integration on the scale of the macro-logistic system, while many problems will outgrow the logistical aspect and take on a macroeconomic character.

Logistics, in our opinion, at this stage will retain its paradigm character as a resource-saving algorithm of entrepreneurial activity and will functionally include logistics management and supply chain management.

However, we do not exclude the appearance of the SCM paradigm in the future, and, therefore, the new direction of the company's functional management.

As stated above, the supply chain is, first of all, a set of organizations: suppliers, manufacturers, consumers and intermediaries, interconnected by a technological chain.

The definition of the supply chain can be based on both object and process comprehension.

The supply chain (object approach) is “a set of organizations (manufacturers, warehouses, distributors, 3RL and 4PL providers, freight forwarders, of wholesale and retail trade) that interact in material, financial and information flows, as well as service flows from sources of raw materials to the final consumer.”

Essentially, supply chains are a combination of suppliers and consumers who are consistently interacting with each other: each consumer then becomes a supplier for the following, and so on until the finished product arrives to the final user. In the general case, the goal of supply includes a focal (central) company, which determines the structure of the chain, suppliers and consumers, as well as various intermediaries. Several levels of suppliers and consumers are distinguished depending on their position in relation to the focal company.

Suppliers and consumers of the first level are those organizations that interact (buy or sell goods and services) directly with the focal (central) company. Suppliers and consumers of the second level are suppliers of suppliers and consumers of consumers of the first level, etc. up to the initial supplier (supplier of natural resources) and the final consumer. Each company can build its own supply chain, because its management sees its company as the central one and therefore considers potential participants in the network structure, according to the interests of its company.

The supply chain (process approach) is “a set of flows and the corresponding cooperative and coordination processes between the various participants in the value chain to meet the requirements of consumers in goods and services” [9].

It is advisable to classify supply chains according to the following criteria:

1. By the number of levels of suppliers and consumers in the supply chain.
2. By the type of products manufactured.
3. By nationality.

1. According to the number of levels of suppliers and consumers, supply chains can be direct, extended or maximum.

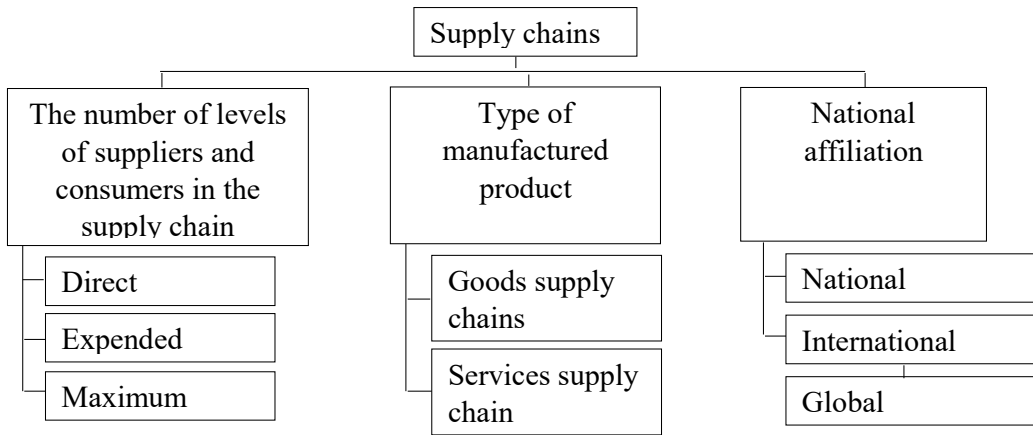


Figure 2. Classification of supply chains

Source: developed by the authors

A direct supply chain consists of a manufacturer, which, as a rule, becomes a focal company (the central supply chain company, around which the goal of supply is built), a first-level supplier and consumer who interact directly with the focal company in the process of moving goods, information and financial flows.

The number of suppliers and consumers in the supply chain may vary. The maximum supply chain consists of a focal company and all its contractors on the left (up to suppliers of raw materials and natural resources), and a distribution network on the right – up to final consumers, as well as various intermediaries. Essentially, the maximum supply chain is an extensive network of suppliers and consumers at various levels, as well as intermediaries with whom participants in the supply chain interact at various stages of the goods distribution process.

2. According to the type of products manufactured, the supply chains are divided into the supply chain of goods and the supply chain of services. Supply chains can function both in product markets and in service markets. From the point of view of carrying out commercial activities, a product is an object of sale.

A service is the result of labor activity, in the process of which “a new material product that did not exist previously is nor created, but the quality of the existing product is changed. In other words, it is a value provided not in material form, but rather in the form of activity. Thus, the very provision of services creates the desired result. ”Services include the implementation of the following kinds of activities: transportation, storage, insurance, paperwork, repair and warranty services, domestic services, medicine, sports and fitness services, etc.

The service market is the sphere of exchange of services that are the result of labor of non-productive enterprises.

A number of factors differ the service market from the product market. General features that arise when managing supply chains in the markets of any services are based on differences in characteristics between goods and services. The following

features are the most significant ones among these differences that arise when managing supply chains in the service markets:

- intangibility of services, since it is difficult for service providers to explain and give specifications for the types of service, and it is also difficult for customers to evaluate them;
- the buyer often takes a direct part in the production of services;
- services are consumed the moment they are produced, i.e. services are not stocked or transported;
- the buyer never becomes the owner when purchasing services;
- a service is an activity, and therefore it cannot be qualitatively determined before the buyer buys it.

These features affect the overall appearance of the supply chain of services. Since the provision of a service is often associated with a tangible product, counteractors to the left of the focal service manufacturing company (providers of various levels) can represent an extensive network, while counteractors to the right of the focal company are absent, since the services are produced and consumed at the same time, they are neither stored nor transported.

3. By national affiliation, ie depending on whether the supply chain is limited to the territory of one state or not, there are national and international supply chains.

National supply chains are limited to the territory of one state; all links in such a supply chain are located within the same country, including suppliers and consumers. This means that goods or services produced by counteractors of the national supply chain are made from raw materials extracted or received in the territory of a particular country. All consumers, including final ones, are also located within this specific country.

International supply chains are not limited to one state; various links of such a chain can be located in the territory of one or more countries. Global supply chains are a form of international supply chain, since most supply chains are currently geographically dispersed networks that reach far beyond the territory of one country. The formation and development of such supply chains was particularly influenced by the process of globalization, which is the creation of a single global economic space (Table 2).

It should be emphasized that supply chain management involves the search for such an integration of business processes from the manufacturer to the final consumer that will allow all participants to get the desired level of profitability, and the final consumer - the product with the desired properties (quality, price, quantity, location, time).

The basis of integration processes in this case is the search for favorable (first of all, minimum for the end consumer) logistics costs. However, it is known that the goals of each individual participant in the supply chain can have, and most often do have a different focus. Increasing the level of some costs leads to a decrease in others. For this very reason the approach to the formation of the supply chain should, in our opinion, be based on an iterative procedure, taking into account the interconnection and mutual influence of two functional areas of logistics: transport and storage (Figure 3).

Table 2. Brief description of supply chains

Classification feature	Supply Chain Types	A brief description
The number of levels of suppliers and consumers in the supply chain	Direct	A direct supply chain consists of a manufacturer, supplier and consumer and first-level consumers directly interacting with a focal company in the process of moving goods, information and financial flows
	Expanded	Expanded supply chain from the focus company, suppliers and consumers of the first and second levels
	Maximum	The maximum supply chain consists of a focal company and all its contractors on the left (up to suppliers of raw materials and natural resources), and a distribution network on the right – up to final consumers, as well as various intermediaries
Type of product manufactured	Product supply chain	Supply chains of goods consist of a focal company-producer of goods, suppliers of raw materials and supplies needed for their production and consumers of various levels
	Service supply chains	Service supply chains consist of a focal company-producer of services, suppliers of goods necessary for their production and final consumers of services
National affiliation	National	National supply chains are limited to the territory of one state; all links of such a supply chain are within the same country, including suppliers and consumers
	International: - direct international; - global	International supply chains are not limited to one state; various links of such a chain may be located in one or more countries

Source: systematized by the authors on the basis of [6; 8]

The formation of the supply chain, thus, assumes that the result obtained at each stage is not only the initial one for the next stage in the block under consideration, but should also be taken into account when solving problems in the neighboring block. For instance, the choice of mode of transport depends on the intended location of the warehouses and their infrastructure, and the choice of vehicle is largely determined by the optimal order lot. In its turn, the size of the order will depend on the cost of transportation, that is, on the type of transport, type of vehicle. At the same time, it is common that when tightening the fulfillment of the requirement “right on time” or increasing the speed of delivery, the cost of transportation soars.

The interdependence of decisions does not allow to uniquely form a supply chain, it should have a fairly mobile structure that will quickly respond to changes in consumer needs. In this regard, you can refer to the marketing section, which is associated with the construction of network organizations [1; 5].

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Among the distinctive features of network organizations, the following ones are considered the most significant:

1. Multilateral contractual relationships between network participants.
2. The principle of openness for each other, mutual trust and shared responsibility for the final result of the network.
3. Sharing of assets, resources, capabilities of several enterprises included in the network.

4. Orientation to market mechanisms for coordinating the activities of network participants, and not to administrative mechanisms.
5. Drive to the use of information technology and the exchange of information online.

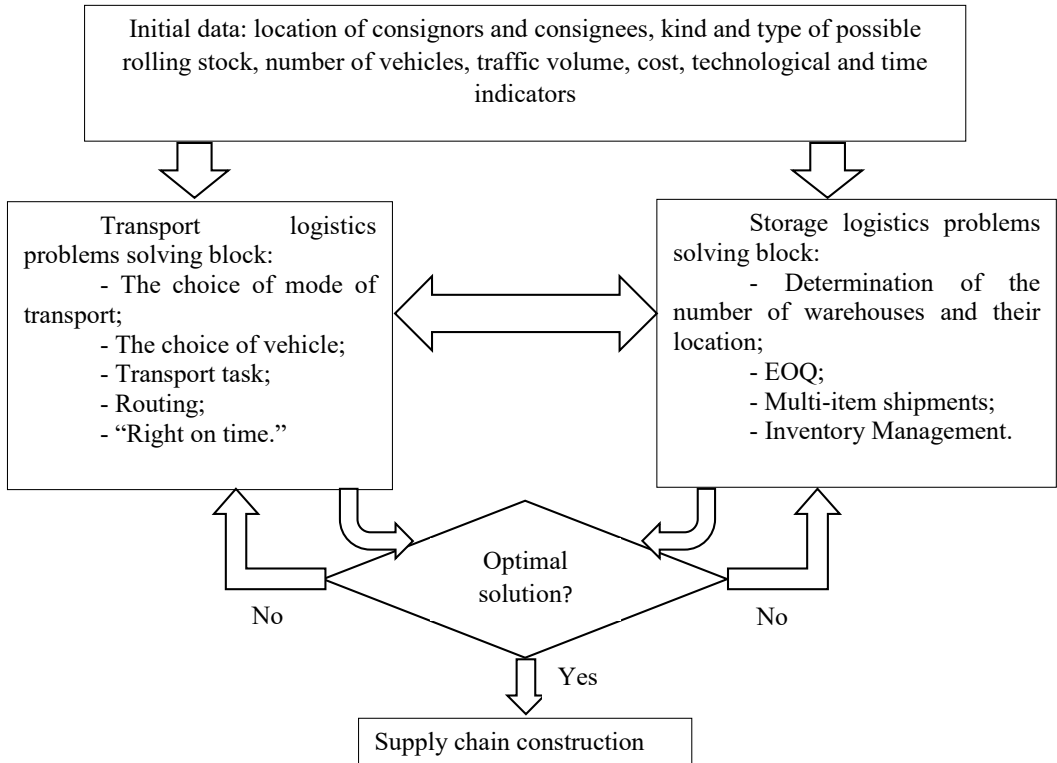


Figure 3. General approach to the formation of the supply chain

Source: developed by the authors based on [5; 7]

However, it should be noted that in the theory of relationship marketing the greatest attention is paid to the formation of a common goal, i.e. functioning of the network, the form of integration of participants, etc. Whereas issues of designing the supply chain, the formation of a system for promoting the material flow that is optimal for the final consumer, transportation tasks, etc., are gaining importance for logistics. Thus, it can be argued that the basis for building the optimal supply chain can and should be the mutual penetration of theories, but with regard to the specifics of the tasks being solved.

The supply chain management process should be considered as a whole, regardless of the functions performed and the influence of a single participant in the supply chain and its contribution to increasing the aggregate value of all its participants. The purpose of integration is to manage and improve a complex network

of relationships through the integration of links, the sharing of technology, information and resources.

There are several reasons to why cooperation and interaction within the supply chain should be developed:

- participants in the supply chain recognize the presence of common: interests in relation to the development, implementation of innovations and the creation of products of value to the consumer;
- individual companies believe that they cannot afford to invest in the innovations they need;
- risks can be shared between several organizations;
- the ability to gain access to new markets;
- cooperation with other companies located in another country or region can reduce the level of political risks, and therefore, avoid additional costs.

One of the most important categories in logistics is logistic costs, the optimization of which allows us to assess the feasibility of transforming the logistics system. In this case, we are talking about “total costs” for the implementation of individual processes in the framework of a specific business process.

The concept of “total costs” means that the system should not strive to minimize costs at all stages of the process. Moreover, cost reduction in one area can lead to higher costs in another area of activity. It does not matter, for example, what the structure of the costs of warehousing or transportation will be if the enterprise as a whole fulfills its tasks with minimal total costs, since in the market system “price of the service and its quality” the logistics services for a minimum price are not the most competitive, but on the contrary those companies that provide the maximum beneficial effect in the economy, due to the use of logistics.

Thus, the main idea of the interaction of counteractors in supply chains is to consider the process of movement of material, financial information and other flows not individually, but in the system, from the point of view of a single process.

The construction of such a system requires a system of reliable information on the movement of products, i.e. not just operational support of material flows by information, but real-time operational communications, guaranteed by the use of operational information services for material flows in the logistics system. To solve these problems, a specialized structural unit of the company (logistics department, logistics coordination center, etc.) is required, which is responsible for managing and coordinating information and material flows.

However, when developing logistics systems, it is necessary to strive to ensure that they are organically integrated into the natural practical activities of the enterprise and ultimately become their integral part and means of solving strategic problems.

CONCLUSION

Thus, intra-company and inter-company logistic interaction in activities leads to the following:

- allows to minimize total costs of organizing material flows within the enterprises themselves and beyond, thereby increasing the competitiveness of this economic structure;
- helps to improve the quality of the set of operations performed, which is important from the point of view of relations with the consumer and satisfaction of their requirements in a competitive environment;
- contributes to the optimization of the enterprise management system, which increases competitiveness and economic stability, reliability, both of individual enterprises and their combination within the framework of strategic alliances;
- largely determines the development trends of integration processes between commercial organizations, municipal and state structures within regions and at the federal level of government;
- provides a positive impact on the formation, development of the logistics infrastructure and innovative processes in various business structures, companies and in the process of their interaction for the purpose of supply.

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